IN THE CLAIMS:

1. (Currently Amended) A method for collecting data for use in image reconstruction of a scattering target medium, comprising:

providing a source for directing at least one wavelength of near infrared energy into a target medium;

providing a detector for measuring diffusely scattered near infrared energy emerging from the target medium;

selecting at least one wavelength of near infrared energy, wherein the at least one wavelength of near infrared energy is selected to maximize the total path length of near infrared energy propagating through the target medium from the source to a detector and to maintain an acceptable energy density at the detector;

directing at least one selected wavelength of near infrared energy into the target medium; and

measuring at least one wavelength of diffusely scattered near infrared energy emerging from the target medium;

providing a plurality of detectors at a plurality of distances from the source, and

selecting a single wavelength to maximize the total path length of near infrared energy from the source to a detector furthest from the source and to maintain an acceptable energy density at the farthest detector.

2. (Previously Presented) The method of claim 1, wherein the total path length is the sum of a plurality of total mean free path lengths a particle of near infrared energy travels as it

propagates through the medium from the source to a detector.

3. (Original) The method of claim 1, wherein a single detector is provided.

4. (Canceled).

5. (Canceled).

6. (Currently Amended) The method of claim [[5]]1, wherein the farthest detector is the detector having lowest energy density measurement among the plurality of detectors.

7. (Currently Amended) The method of claim [[5]]1, wherein the farthest detector is the detector detecting the diffusely scattered near infrared energy having the longest total path length among the total path lengths of the energy propagating from source to each of the plurality of detectors.

8. (Currently Amended) The method of claim [[4]]1, wherein a plurality of different wavelengths are selected, each of the plurality of wavelengths being selected to maximize the total path length of near infrared energy from the source to a detector and to maintain an acceptable energy density at the detector.

9. (Previously Presented) The method of claim 1, wherein selecting at least one wavelength comprises:

directing a wavelength of near infrared energy into the target medium;

measuring the emerging diffusely scattered near infrared energy from the target with at least one detector;

adjusting the wavelength of the near infrared energy based on the measured emerging diffusely scattered near infrared energy to maximize the total path length and to maintain an acceptable energy density at a detector; and

selecting at least one wavelength of near infrared energy having a maximized total path length from the source to at least one detector and an acceptable energy density at a detector.

10. (Original) The method of claim 9, wherein the wavelength is adjusted to increase the total path length and decrease the energy density at a detector.

11. (Original) The method of claim 9, wherein the wavelength is adjusted to decrease the total path length and increase the energy density at a detector.

12. (Original) The method of claim 9, wherein the adjusting step is repeated until a wavelength is selected.

13. (Original) The method of claim 9, wherein the adjusting step is repeated until a plurality of wavelengths are selected.

14. (Original) The method of claim 1, further comprising radially compressing the target medium.

15. (Currently Amended) The method of claim [[15]]14, wherein the radial compression is prior to selecting the at least one wavelength.

16. (Original) The method of claim 15, wherein the target medium comprises a background medium and an object medium having different compressibility

17. (Original) The method of claim 16, wherein radially compressing the target medium causes greater compression of the background medium than of the object medium, so that a ratio of object medium to background medium is increased.

18. (Currently Amended) A method of selecting an optimal wavelength of near infrared energy for imaging in a scattering target medium, comprising:

providing a source for directing at least one wavelength of near infrared energy into the target medium;

providing a detector for measuring diffusely scattered near infrared energy emerging from the target medium;

directing a wavelength of near infrared energy into the target medium;

measuring the emerging diffusely scattered near infrared energy from the target with at least one detector; and

adjusting the wavelength of the near infrared energy based on the measured emerging diffusely scattered near infrared energy to maximize the total path length and maintain an acceptable energy density at a detector; and

selecting at least one wavelength of near infrared energy having a maximized total path length through the target medium from the source to at least one detector;

providing a plurality of detectors at a plurality of distances from the source, and

selecting a single wavelength to maximize the total path length of near infrared energy from the source to a detector furthest from the source and to maintain an acceptable energy density at the farthest detector.

19. (Original) The method of claim 18, wherein the wavelength is adjusted to increase the total path length and decrease the energy density at a detector.

20. (Original) The method of claim 18, wherein the wavelength is adjusted to decrease the total path length and increase the energy density at a detector.

21. (Currently Amended) A method for collecting data for use in image reconstruction of a scattering target medium, comprising:

providing a source for directing at least one wavelength of near infrared energy into a target medium wherein the at least one wavelength is selected to maximize the total path length of near infrared energy propagating through the target medium from the source to a detector and to maintain an acceptable energy density at the detector;

providing a detector for measuring diffusely scattered near infrared energy emerging from the target medium;

directing at least one selected wavelength of near infrared energy into the target medium; and

measuring at least one wavelength of diffusely scattered near infrared energy emerging from the target medium;

providing a plurality of detectors at a plurality of distances from the source, and

selecting a single wavelength to maximize the total path length of near infrared energy from the source to a detector furthest from the source and to maintain an acceptable energy density at the farthest detector.

22. (Currently Amended) A system for enhanced imaging of a scattering target medium, comprising:

means for selecting at least one wavelength of near infrared energy, wherein the at least one wavelength of near infrared energy is selected to maximize the total path length of near infrared energy propagating through the target medium from the source to a detector and to maintain an acceptable energy density at the detector;

a source for directing at least one wavelength of near infrared energy into a target medium; and

a detector for measuring diffusely scattered near infrared energy emerging from the target medium;

a means for reconstructing an image of the properties of the target medium;

a plurality of detectors disposed at a plurality of distances from the source; and

a means for selecting a wavelength to maximize the total path length of near infrared energy from the source to a detector farthest from the source and to maintain an acceptable energy density at the farthest detector.

23. (Currently Amended) A system for enhanced imaging of a scattering target medium, comprising:

a source for directing at least one wavelength of near infrared energy into a target medium wherein the at least one wavelength is selected to maximize the total path length of near infrared energy propagating through the target medium from the source to a detector and to maintain an acceptable energy density at the detector;

a detector for measuring diffusely scattered near infrared energy emerging from the target medium; ~~and~~

a means for reconstructing an image of the properties of the target medium;

a plurality of detectors disposed at a plurality of distances from the source; and

a means for selecting a wavelength to maximize the total path length of near infrared energy from the source to a detector farthest from the source and to maintain an acceptable energy density at the farthest detector.